CS315: Assignment on External Mergesort

Marks = 20

Deadline: 17th March, 2025

Implement/simulate the **external mergesort** algorithm.

Input

Your program should take the following inputs:

- file containing the keys (each line contains a single key),
- total number of keys, n
- size of each key, k, in bytes
- disk block size, b, in bytes
- size of available memory, m, in number of blocks

Assume an infinite disk size.
Ensure that your program reads these four integer inputs *in order* after the file that contains the keys.
An example of running the program is

```
./program-name input-file.txt 10000 4 1024 10
```

Disk Access

You may either implement or simulate the program.
You may implement disk access by actually writing to files in the O/S. Each file has the size of a disk block.
You may otherwise simulate the entire program in memory by counting the number of such disk reads/writes.
Keep a count of the total number of disk seeks and disk transfers.

Output

Your program should output the following:

1. The number of merge passes
2. The detailed output after the initial sorted run phase and each subsequent merge pass
3. The total cost (in terms of disk seeks and disk transfers) for the initial sorted run phase and each subsequent merge pass phase (and its sub-phases)
4. The total number of disk seeks and disk transfers

Submission

You should submit the entire running code as a *single zip file*. Name your zip file as `rollno-mergesort.zip`.
After unzipping and compiling, it should produce an executable file that should run automatically with the input format as specified earlier.
The submission is through `canvas.cse.iitk.ac.in`.